For in vitro diagnostic use only.

CE
IVD

Total T4 (TT4) Assay Reagent Kit (CMIA)
Package Insert

INTENDED USE

The Total T4 (TT4) Assay Reagent Kit (CMIA) is a chemiluminescent microparticle immunoassay (CMIA) for the quantitative determination of TT4 in human serum or plasma.

PACKING SIZ

24 Device/Kit,30Device/Kit,48 Device/Kit,60 Device/Kit

SUMMARY

Thyroxine (T4) is an iodine-containing hormone which has a molecular weight of approximately 777 daltons and is secreted by the thyroid gland. T4 and its associate thyroid hormone T3 are responsible for regulating diverse biochemical processes throughout the body which are essential for normal metabolic and neural activity. Although T3 has greater biologic potency, T4 is normally present in human serum in approximately 50-fold excess of circulating T3 and accounts for more than 90% of the circulating protein-bound iodine.T4 is 99.9% bound to serum thyroxine binding proteins (TBP). The hormone is transported bound primarily to thyroxine binding globulin(TBG) and secondarily by thyroxine binding prealbumin (TBPA) and albumin. Less than 0.05% of the total circulating T4 is unbound and therefore biologically active. Clinically, T4 measurements have long been recognized as an aid in the assessment and diagnosis of thyroid status. Elevated T4 values are characteristically seen in patients with overt hyperthyroidism, while T4 levels are generally depressed in patients with overt hypothyroidism. Normal T4 levels accompanied by high T3 values are seen in patients with T3-thyrotoxicosis. T4 levels are altered by physiological or pathological changes in TBP capacity. Thyroxine binding globulin (TBG) capacity has a pronounced effect on the concentration of thyroid hormones. Consequently, T4 levels may be elevated with increased concentrations of TBG, such as in pregnancy, administration of oral contraceptives or estrogen, infectious and chronic active hepatitis, biliary cirrhosis or congenital increase in TBG levels. Conversely, when TBG levels are decreased, such as in nephrotic syndrome, androgen therapy, glucocorticoid therapy, major systemic illness or congenital decrease of TBG, the T4 may be reduced.
Drugs which compete for protein binding sites, such as phenylbutazone, diphenylhydantoin or salicylates, can result in a depressed T4 measurement. Serum T4 levels in neonates and infants are higher than values in the normal adult, due to the increased concentration of TBG in neonate serum.
While in many cases T4 values give good indications of thyroid status, T4 values should be normalized for individual variations in thyroxine binding protein (TBP) capacity. The Free Thyroxine Index (FTI) is conventionally used to achieve this measurement. To ensure maximum diagnostic accuracy the final definition of thyroid status should be determined in conjunction with other thyroid function tests such as TSH, Free T4, Total T3, FTI and clinical evaluation by the physician.
The Total T4 (TT4) Reagent Kit is to be used as an aid in the assessment of thyroid status.

PRINCIPLE OF TEST

The Total T4 (TT4) Assay Reagent Kit (CMIA) is a two-step immunoassay for the quantitative measurement of TT4 in human serum or plasma using CMIA technology, with flexible assay protocols.
In the first step, sample and anti-T4 coated paramagnetic microparticles are combined. TT4 present in the sample binds to the anti-T4 coated microparticles. After that, ALP-labeled T4 antigen conjugate is added to create a reaction mixture in the second step. Following the wash cycle, substrates are added to the reaction mixture. The resulting chemiluminescent reaction is measured as relative light units (RLUs).A direct relationship exists between the amount of Total T4 in the sample and the RLUs detected by the system optics.

REAGENTS

The device is pre-dispensed with buffer needed for single use.
The device is constituted with Buffers described below is the main reagent

Object	Content
Micro-particles Buffer	Anti-T4 (mouse, monoclonal) coated Micro-particles in TRIS buffer with protein (bovine) stabilizer. Minimum concentration: 0.1% solid. Dissociation agent. Preservative: ProClin-300.
Conjugate Buffer	T4 antigen alkaline phosphatase (ALP) labeled conjugate in TRIS buffer with protein (bovine) stabilizer. Preservative: ProClin-300.
Wash Buffer	TRIS buffer with surfactant. Preservative: ProClin-300.
Substrate Buffer	AMPPD, Enhancer, Surfactant, ProClin-300.

Reagent Handing
The reagents in the kit have been assembled into a ready-for-use unit that cannot be separated.
All information required for correct operation is read in from the respective reagent barcodes.

MATERIALS PROVIDED

·The TT4 Test Device
·Product Insert
·Calibration Solution (optional)
·Control Solution (optional)

MATERIALS REQUIRED BUT NOT PROVIDED

·Analyzer

STORAGE AND STABILITY

▪Store at 2-8℃ and avoid light.
▪Do not freeze.
▪Store the reagent kit upright before to use.
▪Expiration date: up to the stated expiration date.
Note: The Total T4 Reagent Kit must be stored at 2-8℃ in an upright position, and must be used immediately after removal from 2-8℃ storage or the device was opened. Unused reagents should be put back into the kit in time.

SPECIMEN COLLECTION AND STORAGE

Specimen Types
Validated specimen types to be used with this assay:

Specimen Types	Collection Tubes
Human serum	Serum Serum separator tubes
Human plasma	Sodium heparin Lithium heparin Potassium EDTA Sodium EDTA

Other anticoagulants have not been validated for use with this assay.
The instrument does not provide the capability to verily specimen type. It is the responsibility of the operator to verify that the correct specimen types are used in the assay.

Specimen Conditions

- Do not use specimens with the following conditions:
  heat-inactivated
  pooled
  grossly hemolyzed
  obvious microbial contamination
- For optimal results, serum and plasma specimens should be free of fibrin, red blood cells or other particulate matter.
- Ensure that complete clot formation in serum specimens has taken place prior to centrifugation. Some specimens especial those from patients receiving anticoagulant or thrombolytic therapy may exhibit increased clotting time. If the specimen is centrifuged before a complete clot forms, the presence of fibrin may cause erroneous results.
- To prevent cross contamination, use of disposable pipettes or pipette tips is recommended.

Preparation for Analysis

- Follow the tube manufacturer's processing instructions for specimen collection tubes.
- Specimens must be mixed THOROUGHLY after thawing, by LOW speed vortex, and centrifuged prior to use to remove red blood cells or particulate matter to ensure consistency in the results.
- Inspect all specimens for bubbles. Remove bubbles with an applicator stick before analysis. Use a new applicator stick for each specimen to prevent cross contamination.

Specimen Storage

Specimen Type	Storage Temperature	Maximum
Serum/Plasma	2-8℃	6 days

- If testing will be delayed more than 12 hours, remove serum or plasma from the clot, serum separator or red blood cells.
- If testing will be delayed more than 6 days, specimens should be frozen at -10℃ or colder.
- Specimens stored frozen at -10℃ or colder for 3 months showed no performance difference.
- Avoid more than 3 freeze/thaw cycles.

Specimen Shipping

- Before shipping specimens, it is recommended that specimens be removed from the clot, red blood cells, or separator gel.
- When shipping specimens, package and label specimens in compliance with applicable state, federal and international regulations covering the transport of clinical specimens and infectious substances.
- Specimens may be shipped ambient, at 2-8℃ (wet ice), or frozen (dry ice). Do not exceed the storage time limitations listed above.

INSTRUMENT

The Total T4 Test Device is designed for use on the REALY Analyzer System.

TEST PROCEDURE

Assay Procedure
For optimum performance of the assay follow the directions given in this document for the analyzer concerned. Refer to the appropriate operator's manual for analyzer specific assay instructions. Resuspension of the microparticles takes place automatically prior to use. Read in the test-specific parameters via the reagent barcode. If in exceptional cases the barcode cannot be read, enter the digit sequence of numbers. Bring the cooled reagents to approx. 20℃ and place on the reagent disk of the analyzer. Avoid foam formation. The system automatically regulates the temperature of the reagents.
For this test device, the transfer volume of specimens, calibrators or controls into the sample hole is 80 µL. (No less than 80 µL.)
Reagent strips should be left at room temperature between 20 and 25 ℃ for more than 30 minutes before use and kept away from light.
In order to avoid the magnetic beads adsorbed on the side wall and top due to the upside down and side placement of the reagent strip during transportation, the reagent strip should be mixed by shaking and mixing before use. The reagent strip should be mixed upside down for about 30 seconds, and then the reagent strip should be mixed upward for about 30 seconds.The reagent strip was then gently shaken so that the magnetic beads fell completely to the bottom of the strip.

Calibration

Every Test Device has a bar-coded label containing specific information for calibration of the particular reagent lot. The predefined master curve is adapted to the analyzer using the relevant CalSet.

Calibration frequency: Calibration must be performed before new lot of device is used. Renewed calibration is recommended as follows:

- After 90 days (when using the same reagent lot on the analyzer);
- As required: e.g. quality control findings outside the defined limits.

Note: Refer to Instruction of Analyzer for the procedure of calibration.

Quality Control

For quality control, please use Control of REALY or Control Universal.

In addition, other suitable control material can be used. Controls for the various concentration ranges should be run individually at least once every 24 hours when the test is in use, once per reagent kit, and following each calibration.

The control intervals and limits should be adapted to each laboratory's individual requirements. Values obtained should fall within the defined limits. Each laboratory should establish corrective measures to be taken if values fall outside the defined limits.

Specimen Dilution Procedures

Specimens with a TT4 concentration greater than 250 ng/mL will be flagged as ">250.00 ng/mL" and may be diluted using Manual Dilution Procedure. Use the 1:2 dilutions is recommended. The operator must enter the dilution factor in the Patient or Control order screen. The system will use this dilution factor to automatically calculate the concentration of the sample before dilution.

EXPECTED VALUES

Normal reference value: 4.4-11.4 μg/dL.

Conversion factors:

nmol/L × 0.077688 = μg/dL

μg/dL × 12.872 = nmol/L

nmol/L × 0.77688 = μg/L = ng/mL

Results may differ between laboratories due to variations in population and test method. If necessary, each laboratory should establish its own reference range.

INTERPRETATION OF RESULTS

As interpret the results, the patient's overall clinical situation, including symptoms, medical history and other related data, should be referred to.

LIMITATIONS

- Assay results should be utilized in conjunction with other clinical and laboratory data to assist the clinician in making individual patient management decisions. A skillful technique and strict adherence to the instructions are necessary to obtain reliable results. Procedural directions must be followed exactly and careful technique must be used to obtain valid results.
- If the Total T4 results are inconsistent with clinical evidence, additional testing is suggested to confirm the result.
- For diagnostic purposes, results should be used in conjunction with other data; e.g., symptoms, results of other tests, clinical impressions, etc.
- Specimens from patients who have received preparations of mouse monoclonal antibodies for diagnosis or therapy may contain human anti-mouse antibodies (HAMA). Specimens containing HAMA may produce anomalous values when tested with assay kits such as the Total T4 Reagent Kit that employ mouse monoclonal antibodies.
- Heterophilic antibodies in human serum can react with reagent immunoglobulins, interfering with in vitro immunoassays. Patients routinely exposed to animals or to animal serum products can be prone to this interference and anomalous results may be observed. Additional information may be required for diagnosis.
- Although the Total T4 Reagent Kit is specifically designed to minimize the effects of HAMA and heterophilic antibodies, assay results that are not consistent with other clinical observations may require additional information for diagnosis.

PERFORMANCE CHARACTERISTICS

Linearity

Linearity of the Total T4 (TT4) Assay Reagent Kit (CMIA) was determined by use TT4 calibrator to prepare the 6 different specimens, measuring all these specimens follow the test instruction and then do linear fitting, the results show that the linear correlation coefficient (r) was better than 0.9900.

Precision / Reproducibility

Intra-assay coefficient of variation was evaluated on 3 different levels of control serum. Repeatedly measured 20 times, calculating the coefficient of variation.

Intra-assay Precision			
Control	Mean (ng/mL)	SD (ng/mL)	CV
Level 1	51.1	1.55	3.03%
Level 2	95.9	3.52	3.67%
Level 3	191.2	11.42	5.97%

Inter-assay coefficient of variation was evaluated on three batches of kits. Repeatedly measured 3 different levels of control serum 30 times, calculating the coefficient of variation.

Inter-assay Precision			
Control	Mean (ng/mL)	SD (ng/mL)	CV
Level 1	50.6	1.83	3.62%
Level 2	96.6	4.64	4.80%
Level 3	192.4	11.97	6.22%

Analytical Sensitivity

The analytical sensitivity is defined as the concentration of Total T4 equivalent to the mean RLU of 20 replicates of the zero standard minus two standard deviations corresponding to the concentration from the standard curve. The analytical sensitivity is typically less than 10 ng/mL.

Specificity

The Total T4 Reagent Kit is designed to have a mean analytical specificity of ≤3.2% cross reactivity with Triiodothyronine (T3) at a concentration of 100 ng/mL.

Interfering Substances

The following compounds in both low-level specimen and high-level specimen show no cross-reactivity when tested with the Total T4 Reagent Kit at a concentration below:

Compound	Concentration
Bilirubin	20 mg/dL
Hemoglobin	500 mg/dL
Triglycerides	1000 mg/dL

Method Comparison

A comparison of the Total T4 Reagent Kit (y) with a commercially available Total T4 test (x) using clinical samples gave the following correlations (ng/mL):

Linear regression

y=0.9761x+0.2677

r=0.9570

Number of samples measured: 83

The sample concentrations were between about 11.0 – 214.0 ng/mL.

WARNINGS AND PRECAUTIONS

- For *In Vitro* Diagnostic Use.
- Do not use expired or clearly damaged kits.
- Operating according to the steps described, can make the risk of daily handling patients` samples and blood products into a minimum, however, no matter what the source of the products, handling mode or the previous proof, these potentially infectious substances were used shall be in accordance with the unified considerations and Good Laboratory Practice (GLP).
- Proper disinfectant should be used to eliminate pollution.
- Follow local rules and regulations to keep and dispose of these items and containers for these items.
- The ProClin-300 is a potential skin sensitizer. Avoid dumping or splashing this reagent on your skin and clothing. In case of contact with this reagent, wash thoroughly with soap and water.
- Avoid foam formation in all reagents and sample types (specimens, calibrators and controls).
- Any modification of the procedure is likely to alter the results.
- Bacterial contamination or repeated freeze-thaw cycles may affect the test results.
- The reagents should be kept away from light, and unused reagents should be put back into the kit in time and be careful to avoid light.

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SYMBOLS

Symbol	Meaning	Symbol	Meaning
IVD	In vitro diagnostic medical device		Storage temperature limit
	Manufacturer	EC REP	Authorized representative in the European Community /European Union
	Date of Manufacture		Use-by date
	Do not re-use		Consult instructions for use or consult electronic instructions for use
LOT	Batch code		Do not use if package is damaged and consult instructions for use
REF	Catalogue number		Contains sufficient for <n> tests

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Number:1100105602
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